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IV. An Account of BOOKS.

An Account of the Third Volume of Dr. Wallis's Opera Mathematica, in Folio; finished and published at Oxford, 1699; the two former Volumes having been published in the Years 1693 and 1695.

HOW much the Learned World has been obliged to the Reverend and Worthy Dr. Wallis, S. T. D. (Professor of Geometry in the University of Oxford, and Fellow of the Royal Society) is evident to all who have any Concern in these Matters. The great Improvements that have been made in Mathematical Learning in this Century now expiring, are very much owing to him, who, for more than one half of it, has made so great a Figure among the Mathematicians.

The two first Volumes of his Works, of which there is an Account given in N^o 216 of these Transactions, are lasting Monuments of his great Reach, Industry, and Success in these abstruse and useful Studies.

Much of this Third Volume is employed in Preserving and Restoring divers Ancient Greek Authors (very considerable) which were in Danger of being lost. For which Work the Doctor is fitted not only by his excellent Knowledge in Mathematicks, Accurateness in the Languages, and great Industry in collating Manuscript Copies; but also, by what is peculiar to him, his Art and Practice in *Deciphering*; which enables him to make sagacious Conjectures, Supplements, and Emendations: Which must often be an Editor's Business, and which we so justly admire in him.

He begins with that of *Ptolemy's Harmonicks*, the most considerable of all the Greek Musicians. This he had first publish'd in the Year 1682, (and hath now reprinted) out of 11 or 12 Greek Manuscript Copies, (having been never before published in Greek, and but very Imperfectly in Latine, by *Gagovinus*, more than an Hundred Years ago.) To this he gives a new Latine *Translation*, with large *Notes*; giving Account of the *Various Readings* in the several Copies, and the Reasons of what *Emendations* he thought necessary to make; with clear *Explications* of what might seem difficult in the Greek Musick.

To this he subjoins an excellent Treatise of his own, comparing the *Ancient Greek Musick* with that of the *present Age*; whereby that which was before Admired rather than Understood, is now rendred very *Intelligible*, according to the Language of Modern Musick.

Next to this is the Commentary of *Porphyrius* (in Greek and Latine) on a great part of *Ptolemy's Harmonicks*; never till now published in either Language: With like *Notes*, and necessary *Emendations*, as the former.

Then follow the *Harmonicks* of *Manuel Bryennius*, (now first publish'd) in Greek and Latine; with *Notes*, and necessary *Emendations*, as the rest.

So that now we have all the *Ancient Greek Musicians* (which are known to be extant) published in Greek and Latine: *Marcus Meibomius* having formerly published divers of them in the Year 1652; and the remaining Three (which he seems to have intended, but did not publish) being now added.

The next Piece is *Archimedes's Arenarius*, or *ταῦπις*, (which he had first published in the Year 1676.) Of this we had a Greek Edition of *Hervagius*, published at *Basil*, in the Year 1544; which seems to be done by *Hervagius* with great Care and Fidelity, but out of a very

very faulty Manuscript Copy. Of which, (beside some others) there is extant a Latine Translation of *Commandinus*, (a Person who hath very well deserved of the Mathematicks) but out of a *faulty* Greek Copy, of which he oft complains : So that in many other Places he doth rather attempt giving the Sense, than the Words of his Author ; and even in that doth many times mistake. For whereas *Eutocius* had long since revised divers Pieces of *Archimedes*, and given us his Commentaries and Emendations of them ; this Piece (with some others) had escaped his Care, and so remained (uncorrected) with all the old Errors which had then happen'd ; and, in the old *Dorick Dialect* (which *Eutocius* had changed with the *Attick* in most of those Pieces which he had revised) and but very few Copies remaining, (of which *Hervagius* seems to have had but one, and *Commandinus* either but the same, or but one other.) And the present Editor having no Manuscript Copy to consult, was left to use his own Sagacity, making *Rational Conjectures* (from the Foot-steps remaining which *Hervagius* had carefully preserved in his Edition of his faulty Copy) for Restoring this Excellent Piece of *Archimedes*.

To this was then subjoined (and is now reprinted) that of *Archimedes*, called *Kύλ& Μέτρως*, or *Dimensio Circuli*, (a Piece worthily admired and valued by all Mathematicians since his Time) which had been formerly published in Greek, with other Works of *Archimedes*, in the *Basil* Edition, by *Hervagius* ; not without some *Sphalmata*, but much fewer than those of the former Tract, by reason that this had been revised by *Eutocius*, and thereby freed from many Errors which before that time had happened ; but subject to some others which have happened since.

To this, (because very succinctly handled by *Archimedes*) was then added (and is now reprinted) the Commentary

mentary of *Eutocius*, (formerly extant in Greek, but now published in Greek and Latine) partly, as a *Specimen* of the Method which the Greek Commentators were wont to use for explaining of more ancient Authors ; partly to illustrate that of *Archimedes*, whose Demonstrations were very brief, and his Calculations only pointed at ; which *Eutocius* hath actually performed : And chiefly, to shew how troublesome it was (at that time) to perform the Arithmetical Operations of Division and Extraction of Roots, (and other intricate Operations) before the Introduction of the *Indian Algorism*, (or Calculation by the *Numeral Figures* now in use) of which *Archimedes*, in his *Arenarius*, gives us the true Foundation, as to the *Oeconomy* of Numbers, but without the *Notation* now in use.

After these Pieces of *Archimedes* and *Eutocius*, in Greek and Latine, (with necessary *Notes*) follows a Treatise of *Aristarchus Samius*, (*De Magnitudinibus & Distantiis Solis & Lunæ*) first published by Dr. *Wallis* (out of some Manuscript Copies) in the Year 1688, (and now reprinted) with the Latine Translation of *Commandinus*; and with the Annotations of *Commandinus*, and of his own.

To this was then subjoined (and is now reprinted) in Greek and Latine, a *Fragment* of the *Second Book* of *Pappus Alexandrinus*'s Mathematick Collections. The *Latine Translation* of which Author, published by *Commandinus*, (the Greek being not yet published by any, but whereof there are in *Oxford* some M. S. Copies) begins at the *Third Book* (the two former being wanting.) But a good part of the *Second Book* (being extant at *Oxford*, in one *Greek Manuscript*) is now published in Greek and Latine : Whereby we may judge of the Contents of what is lost ; and that the Loss is not great. ; as giving an Account of the *Arithmetical Operations* then in use;

use ; which are now performed with much more Advantage by the *Algorithm* or *Numeral Figures* now in use.

After this Preservation and Restitution of these ancient Greek Authors, here follows a Collection of divers Letters (relating to *Mathematical Affairs*) which have formerly passed between Mr. Oldenburg, the Lord Brouncker, Mr. Newton, Monsieur Libnitz; and, more lately, between Dr. Wallis, Monsieur Libnitz, Monsieur Menkenius, and some others) wherein may be seen by what Steps some of the late Methods for the improving and promoting of Mathematicks have proceeded (and by whom truly made, and to whom justly owing) as that of Dr. Wallis's *Arithmetica Infinitorum*; which, by way of *Induction* and *Interpolation*, (proper Methods of *Investigation*, but with *Demonstrative Certainty*,) hath given an Inlet to many new Discoveries, not formerly thought of, (Reducing *Geometrical Inquiries* to purely Abstracted *Arithmetical Consideration*:) And that of Mr. Newton's *Methodus Fluxionum*; and Monsieur Libnitz's *Calculus Differentialis*; with some others.

There is also an Account of the Business of *Deciphering* (wherein Dr. Wallis hath been so remarkable) with some Specimens thereof. Which Art of the Doctors, Monsieur Libnitz, (a competent Judge) among many others, in a Letter dated the 24th. of March, 1698, which in this Collection is Epist. XXV. Pag. 688, calls the greatest Instance that is known of the Force and Penetration of humane Understanding.

With these follows a Letter of Dr. Wallis, wherein he gives an Account of his Methods for teaching Persons *Deaf and Dumb* to speak, and to understand a *Language*, and thereby to express their Minds by *writing*; and to understand what other Improvements of *Knowledge* may be obtained by *reading*: And for the correcting of Impediments of Speech from *Stuttering* or *Stammering*, or
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other *Imperfections* in the pronouncing some *Sounds* (of our own or other Languages :) All which he hath exercised with good Success, and doth here give an Account of the *Method* whereby he hath done it. The which Letter (in English) we have given an Account, in N^o. 245.

And, Lastly, here is a Letter of Mr. Flamsteed; wherein he gives an Account of a very remarkable Discovery of the *Parallaxis of the Earth's Annual Orb*, observable in some of the *fixed Stars*. Which is a noble *Phænomenon*, diligently sought after, for some Ages, but hitherto without Success; and now at length discovered in *England*, and confirmed by the concurrent Observations of *Eight Years*, compared together. By which the *Copernican Hypothesis* (as it is wont to be called) seems to be clearly established.

After these Treatises, (more particularly *Mathematical*) he subjoins divers other *Miscellaneous Tracts*; which (though not so purely *Mathematical*) may at least be acceptable to inquisitive Persons, and shew how useful Mathematicks are in most other Studies. Where the Author has so dextrously and successfully applied them.

Amongst these, in the first place, appears his *Tractus de Loquela, Grammatico-Physicus*, (first published in the Year 1653, and since reprinted many times;) wherein he gives a very particular Account of the *Physical* or *Mechanical* Formation of all *Sound's* used in *Speech*, (expressed by the Letters of several Languages :) A Design which is not known to have been (before him) undertaken by any Person: In Pursuance of which he hath undertaken (with Success) to teach some Dumb Persons to speak.

To this is adjoined a *Grammar* of the *English Tongue*, adapted to the peculiar Genius of this Language; very different from that of the *Greek* and *Latine* Languages. Whereby the *English Language* is rendered very *easy*, and *clear*

clear of the Encumbrances which do attend many other (even of the *Modern*) Languages. Which hath been since imitated by some of the French in *Grammaire Universelle*, &c. And this hath been also several times reprinted ; with a *Praxis Grammatica* hereunto annexed, for the easie Understanding and Exercise of the English Language.

Then follows his *Institutio Logica*, first published in the Year 1687. Wherein he makes it his Busines to give a clear Account of the true Foundation of *Logick* ; and reducing the same, from the ordinary *Disputes* in the Schools, to the true Use of it in the common Affairs of Life ; and the Advantages thereof to be made in Rational Discourses and Argumentations of all kinds.

To which are annexed *Three Theses*, or particular *Discourses*, for the Rectifying some Mistakes commonly committed by Logicians in their Treatises of Logick.

After this, follows a *Latine Sermon*, preached by him to the *Determining Batchelors of Arts*, on *Ash Wednesday, Febr. 20. 1655, Stilo Angliae*, (on Tit. 2. 6.) intituled, *Mens Sobria*: Directing them to a Serious and Sober Prosecution of their Studies.

To which is subjoined his *Cursory Exposition* of the *Epistle of Titus*, and a *Theological Thesis*, by him maintained (in the *Vespers* of the Act in the Year 1654) in order to his Degree of *Doctor in Divinity*, (*De Electione; & De Potestate Ministeriali etiam ultra limites particularis Ecclesiae*) first published in the Year 1657.

Then follows another *Latine Sermon*, *De Fœdere Evangelico*; preached to the University of Oxford, (*pro inchoando Termino Academico*) in the Year 1661, (now first published :) From *Gal. 3. 17.* (partly *Theological* and partly *Chronological*) Wherein is particularly discoursed what is the *Promise* or *Covenant* there asserted, in

Contra-distinction to the *Law* there mentioned, and the true Date thereof: And what are those 430 Years which are there said to intervene; with the Force of the *Apostle's Argument* from hence for the *Abolition of Circumcision*, and the *Jewish Rites*, against the Pretensions of the *Judaizing Christians*, or other *Impostors*, contrary to the Truth of the *Christian Religion*, defended by *St. Paul*.

After this follows a *Sermon* preached to the University of *Oxford*, on *Easter-Day*, in the Year 1679, (from *1 Cor. 15. 20.*) Wherein the *Resurrection from the Dead* (both of *Christ* and of *Believers* through him) is clearly asserted. Published in *English* the same Year; and now put into *Latine*.

Then follow some short Discourses, (first published in *English*, in the Year 1692, and now made *Latine*;) One concerning *Melchizedek*; who he was, (most likely to be the same with *Shem*,) and where was that *Salem* of which he was King; (not *Jerusalem*, or any part of *Canaan*; but on the other side of *Jordan*, in the Land of the *Shemites*.) Another concerning *Job*, the Place of his *Habitation*, (near that of *Melchizedek*;) and the Time of his Life, (during the Time while the *Israelites* were in *Egypt*.) Which Treatises were partly *Chorographical*, and partly *Chronological*. And a Third concerning the *Titles* of the *Psalms*, and the *Three Orders* of *Singers* to whom some of them are directed.

After these follow Three Sermons concerning the *Sacred Trinity*; first published in *English*, in the Year 1691, and now made *Latine*: Wherein are contained the Substance (digested into a convenient order) of several Pieces about that time published, for the true *Explication* and *Defence* of the Doctrine of the *Sacred Trinity*: Occasioned by several Pamphlets then printed and published to the Derogation of it.

Then follows a Discourse in Defence of the *Christian Sabbath*, to be celebrated on the *Lord's Day*, or *First Day* of the Week : Being the Substance of *Two Treatises*, published in *English*, in the Years 1692, 1693, in Vindication of the *Lord's Day*, against some Treatises of *T. B.* contending for the *Jews Saturday-Sabbath* to be now observed. Which *Two Treatises* are here made *Latine*, and digested into another order : Wherein the whole Controversie is managed at large, and many Occasional Points therein discussed ; which seem not to have been so well considered by former Writers. With several Particulars Historical, Chronological, and Cosmographical, which are there occasionally discussed and cleared.

And lastly, There is a short Discourse of *Pædo Baptism*, in Answer to a Letter of an *Anti-Pædo-Baptist*, delivering Satisfaction as to that Point.

Which *Miscellaneous Treatises* (if thought not so proper to be subjoined to the Discourses purely *Mathematical*) are so ordered as that they may be separately bound apart.

Dr. *Wallis* having so highly obliged the World with his own Works, and those of some of the Ancients, part of which, as the *Harmonicks of Ptolomy*, &c. (had it not been for him) in all likelihood would never have seen the Light in their Original Language ; being, for their Imperfections despaired of, ever since the Restoration of Learning : We cannot but (with all who know him) wish and hope that he would be pleased (if his great Age may permit) to adorn the succeeding Century also with the Edition of some other of the Ancient Geometers in Greek, as *Apollonius*, *Serenus*, or *Pappus*, which (by the Catalogue of Manuscripts, lately pub-

lished) we see are still in the Libraries of *Oxford*, tho never hitherto printed; And that he may continue in the next (what he has been in this Ceutury) an Ornament to the Chair which he fills in that Famous University.

F I N I S.

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